

Lane (L.C.)

INTRODUCTORY ADDRESS

DELIVERED AT THE

OPENING OF THE COURSE ON

PHYSIOLOGY,

FOR THE SESSION OF 1861-2,

IN THE

Medical Department of the University of the Pacific,

AT

SAN FRANCISCO, CALIFORNIA, NOVEMBER 4th, 1861.

BY DR. L. C. LANE,

PROFESSOR OF PHYSIOLOGY.

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SAN FRANCISCO:

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Professor L. C. LANE:—

Dear Sir: Your able and beautiful address, delivered Nov. 4th, as an introductory to the course on Physiology for 1861-2, has excited the admiration of all the members of your class, and, at a meeting of the same, the undersigned were appointed a committee to address you requesting the favor of the copy for publication in pamphlet form, in order that it may be more widely disseminated than could otherwise be the case. By conferring this favor you will greatly oblige each and all of the students composing the Medical Class of the University of the Pacific.

Respectfully, your obedient servants,

CHAS. E. HOLBROOK,
JOHN E. KUNKLER.
W.M. C. JONES,
Committee.

San Francisco, Cal., Nov. 6, 1861.

SAN FRANCISCO, November 6, 1861.

GENTLEMEN:—Your note, soliciting a copy for publication of my introductory lecture, delivered on the 4th inst., at the opening of my course on Physiology, has been received; in reply, allow me to say that a copy of the same is at your disposition, and, at the same time, I beg leave to tender you my thanks for the honor which is thus unexpectedly extended to my first essay as a lecturer upon this noble department of medicine—the science of Physiology.

I am, very respectfully,

Your obedient servant,

L. C. LANE, M. D.,

*Professor of Physiology, Med. Dep.
of the University of the Pacific.*

Messrs. HOLBROOK, KUNKLER and JONES,

Committee in behalf of the Medical Class of the session of 1861-2.

ADDRESS.

GENTLEMEN STUDENTS:

The science of Physiology, in which I shall give you instruction during the ensuing course of this institution, is both interesting and important; considered in these respects, there is no department of the study of medicine that possesses higher rank. As evidence of its importance, we may state, in the outset, that without an accurate knowledge of many of its principles, no one would ever be able to arrive at eminence either in the practice of medicine or surgery. It teaches and sets forth the laws which govern the body in health; without a knowledge of these laws, it is evident that it would be impossible to judiciously discriminate disease, which is but a deviation from them, and the ushering in of an abnormal condition of the body. Hence its importance in the practice of medicine. So, too, without a knowledge of those principles which obtain in the reparation of parts—which principles are but the laws of Physiology in a modified form—how soon would operative surgery become lost in a labyrinth of obscurity, profound and inextricable? So great is its influence in this respect, that within a few years past the science of surgery is assuming an entirely different character from that which it formerly had. Through the lights and aids which physiological observation and vivisection have furnished us, surgery has assumed a far more conservative type. In modern times, it has been learned that almost all the tissues of the body may be reformed when lost through disease or accident. This is eminently so, in reference to bone. The discovery of this fact has had a great influence upon operative surgery. Limbs which were once sacrificed by amputation, are now preserved to the patient. And this circumstance, which is due to the physiological

fact that bone, muscle, ligament, and even joints themselves, when destroyed, may, in a great measure, be reproduced according to their original type, will prove of infinite good to humanity. The glories which have been won by the catling and saw have passed ; they are wholly eclipsed by the far greater triumphs already, and yet to be, won by the conservative chisel, and scalpel. The achievements of the modern surgeon in the preservation of diseased limbs, should be reckoned among the most splendid triumphs of our period, compared with which the *éclat* which attached to the former methods of mutilation sinks into insignificance.

Every department of medicine is interesting. Indeed, so high did the healing art stand among the ancients, that they could not believe it a human invention, but they referred its origin to the gods. The last bequest of the immortal Socrates was a sacrifice to Esculapius. Yet the science of that period was infinitely limited, compared with its modern developments ; and in none of the departments of medicine have greater advances been made than in the one we have under consideration. The department of Physiology now, of itself, stands as a vast colossal science, grand in its dimensions, and with so much that is strange and marvelous in it, that some of its enthusiastic admirers have applied to it the titles of the "*soul of medicine*," its "*poetry*," its "*flower-garden*." Notwithstanding these titles, borrowed from fancy and enthusiasm, it presents enough of stern material and that class of things called *matter-of-fact*, to give it an abiding place quite out of the sphere of romance, and as a study, for a thorough comprehension of all its principles, severe, rigorous, and close application will be required.

So much importance of late has attached itself to this branch of science, that some of its simple and leading principles have been incorporated in school books, designed for popular instruction. If then a knowledge of Physiology is requisite to the young lady, in order to give elegance and completeness to her education, of how much higher importance must they be to you, prospective practitioners of medicine, to whom the duty will be assigned of alleviating disease in its protean forms, so numerous in fact, that, far outnumbering the Homeric hosts;

"To count them all would need a thousand tongues ;
A throat of brass, and adamantine lungs."

It is your especial province, privilege and duty, to study the countless strange and wondrous laws which govern the human body. This body is more varied and complicated in its structure than any machine that art has ever devised. In it, the Theist sees the evidences of creative wisdom; in the contemplation of the form possessed by this microcosm,—the mere imitation of which has given a fame ever-during to Raphael and Michael Angelo,—and in view of the miracles which are constantly being performed in the maintenance of the living organism, the Atheist is involved in perplexity, and doubts whether fortuitous action can account for such a combination of wonders.

It is to explain the laws which control this marvelous piece of mechanism, that my efforts during the pending course, shall be devoted. Though often our inquiries may conduct us

“Through dark and devious paths of speculation wild,”

yet at all times, we will find something valuable along the wayside, and however rugged and thorny our path may be, still, ever and anon, our labors will be crowned by the discovery of some flower of truth, which, though it may not have the grandeur and gorgeousness of a Victoria Regia, nor the tropical luxuriance of the elegant *Urania*, still, amaranth-like, its tints will be more perennial in nature. In studying the object of digestion, in which the crude materials of the external world are so metamorphised as to become part of our living bodies, or in studying the mysteries within the cranium,

“The dome of thought and palace of the soul,”

we shall meet things as wondrous and extraordinary as can be found in any domain of nature. The brain, with its motor-force, its power of feeling, its coöordinating faculty, its connection with the thinking principle, with the immaterial, imperishable *I*, presents a field for greater admiration and wonder than do all the orbs which glitter in the evening sky. As a piece of superior mechanism may be mentioned the eye, of which the workmanship is so exquisite, and the adaptation of its various parts to the purposes of vision are so complete, that no device of art can be compared with it; and it was only by having the eye as a model of reference, in which the tendency of light to

undergo decomposition in passing through a lenticular apparatus is counteracted, that Euler, the illustrious mathematician, found means to solve the problem of achromatism, which, by Newton, had been regarded as insusceptible of solution. And again, so great is the design exhibited in the structure of the human hand, that Bell considers that it alone affords proof of a divine author, and for his capital treatise on this subject, he won one of the "Bridgewater Prizes."

Hence, from what has been said it is manifest, though our department may be abstruse and dry at times, still, in the details of the "strange, eventful scenes" in which the living organism figures, from its primitive state as a microscopic cell through its varied stages of growth and ultimate decay and death, there is enough to requite the fullest longings for admiration and marvel. The struggle between life and death of which our world is the constant scene, is a drama of deep and momentous import to any one, but preëminently so to him who is conversant with the laws which govern them. To the medical scholar who comprehends all the laws which control the living organism, who sees and understands this vital fabric in all its varied changes, from its primordial commencement as an infinitely minute cell, a mere *macula germinativa* or germinal spot, then its embryonic and foetal life, then its transition from aqueous to aerial existence, this monument of life has a thousand things more wondrous interwoven in its history than had the Memnonian of old, and its contemplation should enkindle in the student a profounder admiration than could be awakened by a view of the Pyramids, the broken remains of the Parthenon or Karnak, or any other architectural wonder of the past.

It has been argued as an objection against Physiology, that it is beset with too many theories and hypotheses, and that, upon the whole, it furnishes little that can be placed under the head of absolute and positive fact. Now, if hypothesis were to be wholly discarded in the establishment of a science, then some of the prominent departments of knowledge would have to be abandoned, for they rest on scarcely any other basis than theory and conjecture. This is especially the case in respect to geology; divest this science of the substratum of theory which lies at its foundation, and this grand fabric, the glory and boast of the

present century, would sink into insignificance. Yet so evident are the results which have followed the adoption of certain hypotheses in geology, and so wholly convincing to those who will thoroughly examine them, that this science has almost obtained a place as enduring in the field of knowledge as that occupied by pure mathematics. The same is now to some extent, and must eventually be entirely, the case in Physiology. Those theories which are at present employed for the illustration of its truths, may be compared to so many scaling ladders to the citadel into which we are seeking entrance, and which, when they have once fulfilled their purpose, may be dispensed with. So remarkably ingenious, however, have been some of those theories, that they still survive as monuments of the shrewdness of their inventors, though the idea embodied in them has ultimately proved to be erroneous. This may be said to be the case in respect to the hypotheses invented by Liebig and Mulder for explaining the transition from venous to arterial blood.

Our science has engaged and occupied the attention of the illustrious and learned of all ages. In far-off antiquity, where the first faint beams of science are dimly perceived struggling with the clouds of ignorance which enshrouded the human mind in the earlier periods of human society, our science was the first to claim attention. Soon after Homer had composed his immortal verse detailing the woes that befel Greece, in consequence of the wrath of Achilles, and the dangers and adventures of the "toil-worn" Ulysses, in his homeward voyage from Troy to Ithaca, there arose a new light in Greece, whose mind being deeply imbued with the truth of the sentiment,

"Feliz qui causas rerum cognoscere potest,"

devoted himself to the quiet pursuits of philosophy, and gave an impulse to philosophical research which continued for centuries afterwards. This was Aristotle. Among the subjects to which Aristotle gave special attention was that of the phenomena exhibited by living beings. Availing himself of the aids furnished by dissection, he strove to enter the penetralia of organized beings, and thereby penetrate the hitherto sealed arcana of life. It is surprising how many truths Aristotle brought to light. The experience of modern times has indeed, found that certain

things which he advanced were erroneous. This is not at all to be wondered at, when we take into account the profound ignorance which at his time had enshrouded the whole subject of animal life. Greatly to his credit, however, be it said, that certain ideas which he advanced, which were doubted by subsequent examiners, have, on more mature research, been found to be correct. This is true in respect to certain of his assertions concerning generation among the Crustacea.

Among its cultivators of the present time, Physiology ranks some of the most eminent minds of the day, both in Europe as well as in our own country ; on this side of the Atlantic, it is with pleasure that we refer to such names as Dunglison, Paine, Leidy, and Dalton. Dalton is, perhaps, to-day in advance of all those engaged in physiological research, on this continent. The correctness with which he has studied the nervous system, and the mysterious subject of generation, augurs well for much new light on this hitherto but partially understood subject. Adopting vivisection as a lamp for his guidance in the daedalian mazes of the nervous system, he is compelling the vagus to reveal some of its complicated functions, as well as some of the other cranial nerves whose office has hitherto been involved in doubt.

In England, the names of Carpenter, Paget, Brown-Séquard, are models for emulation in this department of medicine. Crossing the channel, in France the famous Milne-Edwards, noted for his many classical works on this subject, as well as the distinguished Longet, and the venerable Chevreul, are busily engaged in Physiological research. Indeed, Chevreul, though a septuagenarian, seems still as devoted to his chemico-physiological studies as though he were not satisfied that his researches in regard to the harmony of colors, and his discovery of oleine, stearine and margarine would not embalm his memory among the never to be forgotten illustrious names which are treasured up in the imperishable archives of medicine.

Germany stands preëminently high in medical scholarship ; and I am safe in saying that there we may find to-day, a greater number of devoted scholars engaged in solving the hitherto unexplained questions of Physiology, than in any other part of the world. The Teutonic character is eminently fitted for patient investigation. The Ger-

man investigator can labor for weeks, or even months, in the examination of a single subject, never once becoming tired or forsaking it, until he has thoroughly acquainted himself with every feature of the subject, and everything else that can have a bearing upon it. This method of investigation is difficult for the American student, accustomed, as our people are, to do everything with telegraphic velocity. Still, the Teutonic method is the proper one to lead to ultimate success, and it is to be hoped that it may be adopted more and more by the American scholar. A union of Teutonic patience with the practical element of our countrymen, would, if adopted in literary research, soon yield a rich harvest of scientific discovery.

The principles of Physiology are interesting on account of their perpetuity and unchangeableness; they remain to-day, and in future, constant and fixed as they were a thousand years ago. Similar to the Draconian laws, they are engraven in blood, though unlike them in brevity of existence, their duration is coëval with organized life. Though laws, customs, manners, tastes, and language, together with the objects and pursuits of human ambition are ever changing, still the laws which control life and organic existence remain forever the same; more enduring than the granite and sandstone on which our mountains rest. The note of the nightingale, which singing "darkling," enraptured the ear, or the rainbow-tinted plumage of the humming-bird, which hovered around and sipped the mellifluous sweets of the convolvulus which spread its floral munificence over the azaleas and rhododendra of Eden, were governed by the same laws of vibration and reflection as to-day, govern the same objects. The same appetites and functions, the same demand for carbonaceous and nitrogenous aliment, the same need of oxydation of the tissues have always existed.

Geology in the numerous contributions which it has made to Comparative Anatomy, in bringing from the chambers of the earth, where they had been concealed for ages, the relics of numerous animals, some of which do not now even exist, has furnished ample evidence of the constancy and continuity of plan that has been adhered to in the introduction of the varied forms of animated existence, on the part of the Author of nature. In the fossilized eye of the Trilobite, that exists abundantly

in the Silurian formations of the Ohio Valley, when its various facets and general conformation is studied with reference to the reflection, refraction and transmission of light, it is discovered that the light-wave was governed by the same laws myriads of years ago as to-day. And though no Newton was there to note the relation of equality between the angle of incidence and that of reflection, or to observe that when a ray of light passed from a rarer into a denser medium, it was bent from its original course, and though the cone had been cleft by no mathematical hand to learn the figure of its sections, and to apply the principles of the ellipse and the parabola in the construction of lenses, still the mathematical laws in accordance with which the eye is constructed, then existed, and were obeyed by every ray of light that painted its image on the retina. The fish of that period, with his hemocercal tail, shows, by the form of his jaw, and triple row of teeth, that he had a shark-like appetite, and must have fed on living beings. The mammoth reptiles of that period, demonstrate by their coprolites the same fact. Hence, death has ever been coëval and coëxtensive with life. The pterodactyle of the early geological periods enjoyed his morsel reeking with fresh blood, quite as much as does the cat or the Abyssinian of the genus *homo*, of the present time. Indeed, by a reference to the remains of organized life, which nature has preserved as if it were in a vast *hortus siccus*, where they have been laid up between the pages of the vast volume of creation for the benefit of modern times, there is demonstrated an antiquity for organic life that startled the first investigators in this field so prolific with prodigies.

Though man in his pride stands at the head of creation, and looks down with complacency on the inferior grades of being, still, if he search through the vast domain of vertebrated animals, embracing the mammals, birds, reptiles and fishes, then let him examine the articulated beings, the lobster, the ant, the leech, and the vile worm itself, thence, still descending, let him survey the molluscs,—the mussel, the snail, and the cuttlefish,—and finally closing his survey, let him look through the realm of the star-fishes, and after his thorough examination of these four grand departments of animated nature, he will be compelled to confess that there is not a living creature that in some feature of organization he is not akin to.

Indeed, if a careful comparison be instituted, many animals, in certain respects, are much superior to man. This is especially true in regard to the development of the senses; for example, the perfection of the olfactory sense in certain animals, is well known; also, the sense of sight in certain birds, is far superior to that of man. But, in intellectual endowment, man occupies an immense superiority over all other created beings. It is to his superior brain that he owes his supremacy over the living world. Notwithstanding this superiority, he does not possesss an organ that does not have its analogue in the mammiferous animal. The vertebrata, with man at their head, have been constructed according to one common type. Hence it is, that in studying the functions of the different parts of the human body, we resort to experiments upon the lower animals; indeed, it has been by the aid of vivisection made upon the lower animals, that Physiology has made such rapid strides during the last half century. By means of vivisection, the Physiologist has been able to step into the inner temple of life, and to gaze upon the hitherto ~~unveiled~~ + veiled mysteries that have been hidden within the sacred adytum,—the sanctum sanctorum of living existence. Over the threshold to this inner sanctuary there is no need of inscribing “*procul, O procul este profani,*” for none but the patient and labor-loving student can recognize and read the import of the *penetralia* which nature has veiled there in an obscurity far more profound than that which shrouded the Eleusinian mysteries of olden time.

Besides the aid which vivisection has lent to the Physiologist in modern times, he has received an additional one in the microscope. With the assistance of this instrument, he is able to follow the primitive cell from the period in which it is vacillating between inorganic and organic existence, through the numerous stages of metamorphosis, till it finally receives the stamp and impress of vitality; then, having duly fulfilled its mission in the living organism, by the help of the microscope, it is seen to assume a retrograde march towards the external world, which having reached, it assumes again its inorganic condition. The microscope further shows us, in the various crystalline products which it reveals to us in the living organism, that many of the processes in our bodies are purely chemical in character. This is especially so in regard to the renal

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and biliary products. Even the blood itself, with a little manipulation, is capable of yielding crystalline forms of most elegant shape and outline.

Again, the science of Physiology is most intimately associated with that of Anatomy. Without a knowledge of Anatomy, the principles of Physiology can never be well understood. Before the function of the brain, the heart and the lungs,—the so-called tripod on which life rests,—can be comprehended, the structure of those parts must be well known. Hence, these are kindred sciences, which must ever march, hand in hand, together. Separated, each becomes of little use; both well understood, will furnish the surest guidance, and become the unerring pole-star to a future brilliant professional career. To the surgeon, a thorough knowledge of both is indispensable. Confidently relying on nature's power of reproducing parts, which Physiology has taught him, he boldly removes the diseased bone or offending joint, and true to what vivisection has demonstrated, he finds his operation crowned with success. Hence, Physiology, with its sister science, Anatomy, are twin diamonds in the hilt of the scalpel that "lights its blade" in the surgeon's hand, and give hopeful tokens of recovery to the patient and unerring promise of an enduring reputation to the operator.

In the pursuit of your Physiological studies, I would strongly recommend you to avail yourselves of the aids which are furnished by a knowledge of Natural History. As before stated, nature has adopted a uniformity of plan that prevades all departments of creation, and, as it were, by a chain of adamant, binds together the material universe. The world, with its countless forms of life, whether living in the air, on the earth, or in the depths of the ocean, is but a materialized utterance of a thought of Deity, in which are combined identity, unity, and harmony. These cardinal principles, which may be perceived even on a limited view of nature, become more and more apparent in proportion to the comprehensive view that we take of her objects.

By a careful examination of the laws which govern the production of plants, and of the impossibility of mixing even those genera which are nearly akin, as well as from observations made on the *hybridation* of the inferior animals, the Physiologist has learned the immutability of

form which nature has stamped on every living being. The pollen of the rose, sprinkled on the hyacinth can never produce a hybrid between the two. Nor can the germinating dust of the elegant amaryllis, applied to the homely bloom of the ambrosia, produce a floral type, midway between the parent flowers. The forms of nature are eternally stereotyped. Though art may modify the form of the rose, nay, even convert each stamen into a petal, still the essential form retains the original characteristics of the primeval archetype that bloomed in the early dawn of creation. The same may be said of the animal forms. No hybridization, no human device can alter the forms in which each creature was primitively moulded. Now, it has been from a comprehensive and careful study of these facts, in reference to the incapability of any plant or animal undergoing any essential metamorphosis, that Anthropology has derived its strongest proofs of the identity of origin and unity of the human race, a point to which we hope, in future to be able to refer to again.

Finally, gentlemen, we will express the hope that some of you will study this department of medicine to an extent beyond that which is merely necessary to secure the collegiate honors vested in a diploma. This science, though vast in facts, and prolific in discoveries and researches which have been made in it, is still incomplete. There are many Physiological questions which yet remain to determine, in the human organism; enough indeed, to confer an enduring immortality upon the future laborers who shall solve them. The true nature of the nervous principle,—whether it is electricity, as the Electro-Physiologists contend,—also, the offices which are performed by several parts of the brain; likewise, the functions of the spleen, are all matters involved in the utmost obscurity, the discovery and elucidation of which, will secure unfading laurels, and a lasting reputation to some future investigators. He, however, who would gain such laurels, must remember that their achievement is only possible through hard labor. As Hercules gained admission to the abode of the Olympian Celestials, through the accomplishment of the severest tasks, so the only price of professional eminence is hard toil and vigorous study. In the practice of our profession, one is constantly reminded of the brevity of human existence. Hippocrates, the illustrious and ever

to be venerated father of medicine, commences his Aphorisuses with the following sentence: *Vita brevis, ars verd longa*; that is, "life is short, but art is long," or of vast extent. Still, with proper application and industry, it is wonderful how much may be consummated within a limited period of life. This was illustrated in the career of the immortal Bichat, one of the most successful cultivators of Physiology, who died at the age of thirty-one years. So highly are his discoveries estimated, and so profoundly reverent are his countrymen of his genius, that, as an imperishable evidence of their admiration, they have assigned him a conspicuous place in the illustrious group which, in the marble frontispiece that emblazons the front of the Pantheon, are placed as the first representatives of the glories of France, and as such, are receiving from the Goddess of Fame crowns of immortality. Besides this marble monument, erected by a grateful people to the memory of Bichat, he has left his name upon a still more enduring monument, viz.: the fissure of Bichat, engraven by the temporal bone on the human brain, where it will remain imperishable and indelible, and secure against the revolutions which at times have threatened the destruction of the Pantheon, and have disturbed the repose of the dead that slumber beneath it.